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S·A·E JOURNAL

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SEPTEMBER 1932

SIDE SWAY . . .

removes all comfort in motoring

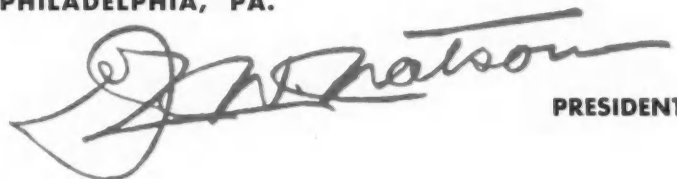
A car which sways not only is unsafe but feels unsafe. No man can feel comfortable when he feels unsafe. The guiding of such a car is always an uncertainty and feels it. Passing to the left of another car one never feels certain whether or not he can get back again against the crown of the road. Rounding curves is always a dread.

Have you ever owned a car you hated to drive? Remove the side sway and you will love it. The coming Watson Double-Acting GYRO Stabilators will hold your car against side sway and make you feel safe because you are safe.

GYRO

FIRM AGAINST SIDE SWAY

**JOHN WARREN WATSON COMPANY
PHILADELPHIA, PA.**



PRESIDENT

S·A·E· JOURNAL

Published by the SOCIETY OF AUTOMOTIVE ENGINEERS, INC., 29 W. 39th St., New York
Cable Address: AUTOENG Telephone: LONGACRE 5-7170

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Vol. 31

September, 1932

No. 3

CONTENTS

General Design and Research

Journal-Bearing Friction in the Region of Thin-Film Lubrication—S. A. McKee and T. R. McKee	(T) 371
Engine Cooling—Louis Schwitzer	(T) 378
Alloys-of-Iron Research	(T) 383
Free-Wheeling Devices and Their Control—Austin M. Wolf—(Discussion)	(T) 384
Automotive Research—Cooperative Fuel Research at Uniontown	21
Notes and Reviews	26

Aeronautic Engineering

Aircraft Advancement Revealed in Cleveland	11
Into the Air in Ships	14
A New Deal in Engines	15
Late Developments in Airplane-Stress Analysis and Their Effect on Airplane Structures—Richard C. Gazley	(T) 345
Importance of Aviation in Canada	(T) 355

Air-Transport-Design Economy and Air-Transport Testing—Frank T. Courtney	(T) 356
Indicators as a Means of Improving Aircraft-Engine Performance—Ford L. Prescott	(T) 361
Higher Air Speed at Less Cost	(T) 381

Production Engineering

S.A.E. Production Meeting in Buffalo	13
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Transportation Engineering

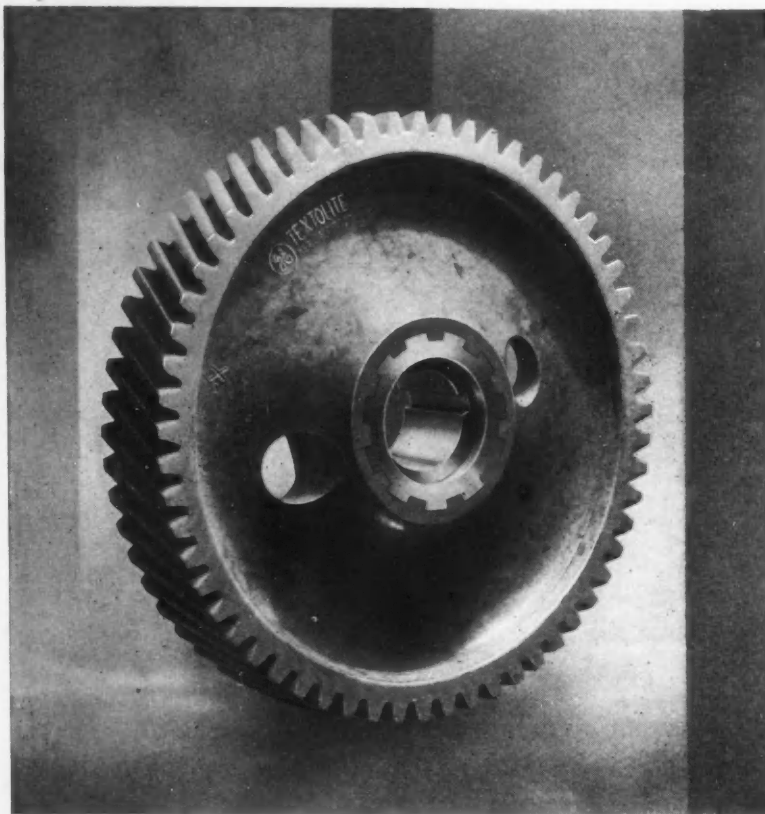
Cordial Canadian Welcome Awaits Transportation Men	16
To Cooperate on Highway Safety	18

News of the Society

Northwest Section Passes Philadelphia Chronicle and Comment	20
Fort Hancock Entertains Metropolitan Section	22
Section Meetings Calendar	22
Personal Notes of the Members	23
Obituaries	24
Applicants for Membership	25

NOTE: Page numbers above that are preceded by (T) refer to the TRANSACTIONS section (between pp. 20 and 21 of the advertising and news section) containing papers and discussions that will be embodied in the volume of S.A.E. TRANSACTIONS for 1932, to be issued early in 1933.

The purpose of meetings of the Society is largely to provide a forum for the presentation of straightforward and frank discussion. Discussion of this kind is encouraged. However, owing to the nature of the Society as an organization, it cannot be responsible for statements or opinions advanced in papers or in discussions at its meetings. The Constitution of the Society has long contained a provision to this effect.



$$F = Ma$$

Do you want to reduce M ?

**TEXTOLITE
TIMING
GEARS**

A NONMETALLIC gear affords the lightest known front-end drive. The material has a specific gravity less than half that of aluminum. Most of the mass of the gear is concentrated near its center, while at the rim, where the velocity is high, the mass is very small. This results in the lowest possible equivalent mass to be accelerated and decelerated.

This reduction in inertia is one of the reasons why representative cars in various price classes use timing gears.

830-103

GENERAL  ELECTRIC

Aircraft Advancements Revealed in Cleveland

Aeronautic Meeting Features New Practices and Ideas in Plane and Engine Design, Research and Economical Transport

THE City of Cleveland is, for the second consecutive year, host to the multitudes of the aeronautic industry. Engineers, executives, pilots and mechanics have again staged a pilgrimage to Cleveland for the 1932 National Air Races.

Keeping pace with the rapid engineering development of this industry requires a constant presentation and discussion of engineering problems and the methods of research resulting therefrom. While to the public the National Air Races are mainly spectacular, they reflect a great amount of serious thought and engineering which each year goes into the various craft taking part. The concentration of engineers again made it advisable, as in other years, for the Society to hold its Aeronautic Meeting on Aug. 30 and 31, at the Hotel Statler.

The meeting covered three distinct phases of aeronautic engi-

neering: airplane structures, powerplants, of which propellers are an integral part; and transport planes. S. J. Zand, Wright Medalist for 1931, continued the research on vibration which was the subject of his prize-winning paper at the meeting in Cleveland last year. The study of instrument-board vibration has been extended to airplane structures, and much was learned about the practical application of the vibrograph to the many vibration problems current as a result of present methods of aircraft construction. The title of Mr. Zand's paper, as presented at the August meeting, is Vibration of Instrument-Boards and Airplane Structures. This paper is scheduled for publication in full in the October issue of the S.A.E. JOURNAL.

For some time past the subject of stress analysis has been under discussion by the Aeronautical Chamber of Commerce of Amer-

ica and the Aeronautics Branch of the Department of Commerce. The Society has recently contributed discussion to this subject through two papers by Prof. J. S. Newell and Edward P. Warner, under the titles, A Rationalization of Load Factors for Airplanes in Flight and The Rational Specification of Airplane Load Factors, which were presented and discussed at the last two technical meetings of the Society. To further this work and provide additional opportunity for the discussion of the problems involved, Richard C. Gazley, of the Aeronautics Branch of the Department of Commerce, who has been foremost in this type of work for the Government, presented at the August meeting a paper on Late Developments in Airplane Stress-Analysis Methods and Their Effect on Airplane Structures, which paper appears in this issue of the JOURNAL, beginning on p. 345.



S. J. ZAND



R. C. GAZLEY



J. M. MCKEE



F. L. PRESCOTT



FRANK COURTNEY

Probably no single feature of the powerplant unit of aircraft has been the subject of more research than has the propeller. Although it seemed early in aviation that steel might have to be abandoned as a propeller material because of its weight, it still appears to be the most logical metal when considering the drastic service that airplane propellers are called upon to perform, according to J. H. McKee, chief engineer of the Pittsburgh Screw & Bolt Co.

Mr. McKee, in his paper on Hollow Steel Propellers, expresses the opinion that the problem of designing a propeller of great strength, with high fatigue-endurance qualities, maintaining at the same time an efficient and proved airfoil section, has to some degree been solved by the development of the hollow steel propeller blade. His paper further presents a description of the method of manufacturing propellers, a detail of the metal analysis, data on heat-treatment, and methods of balancing. Comparisons between duralumin and steel blades is made as to tensile strength, fatigue stress and weight, as well as the application of hollow steel blades to controllable-pitch propellers, and the results. Mr. McKee also covers briefly the research conducted on the silencing of propeller noise.

Prescott on Engine Indicators

The powerplant branch of the Army Air Corps at Wright Field again contributed to the science of engine research with a dissertation by Ford L. Prescott, on engine indicators, in a paper entitled, Indicators as a Means of Improving Aircraft-Engine Performance. Mr.



AMELIA EARHART

Prescott is known to the Society, not alone by virtue of his previous presentation of well-known aeronautic papers, but because of his present position as Chairman of the Dayton Section of the Society. His research work on aeronautic engines is known throughout the world, and in presenting his paper on indicators he has, as usual, thoroughly covered a subject of vital interest and utmost concern to aircraft-engine builders and users. This paper is published in this issue of the S.A.E. JOURNAL, beginning on p. 361.

Transport Design and Profitable Operation

The phenomenal increase in aircraft transportation, the installation of new airlines and the ever-present problems of maintenance and operating economics have re-

sulted in the devotion of much time and thought on the part of both the operator and the airplane designer to the development of suitable passenger transports with a capacity to pay dividends. This phase of aircraft engineering has been for some time a matter of interest to the Society, as it is felt that full opportunity should be given for the presentation and discussion of this engineering problem as well as those purely of design.

Capt. Frank Courtney, internationally known for his work on the testing and designing of large transports, has added further to his previously published works on this subject by a paper on transport-plane design and testing. His paper also is published in this issue, beginning on p. 356.

The second paper on this interesting subject was prepared by Ralph Damon, president of the Curtiss-Wright Airplane Co., in collaboration with George A. Page, Jr., chief engineer, and Kendall Perkins, service engineer, of this company. Their paper entitled, Economic Aspects of Transport-Airplane Design, covers a discussion of the thought that has been given to the type of flying equipment which, as Mr. Damon states, "is at the very foundation of the expense picture, and represents by far the most fertile field for growing economy". The paper deals first with the various conditions that exert an influence on airline operation; second, with the factors that go to make up the earnings of an airline; third, with the relation of those factors to one another and the conditions of operation; fourth, with the earning factors of an as-

(Concluded on p. 24)



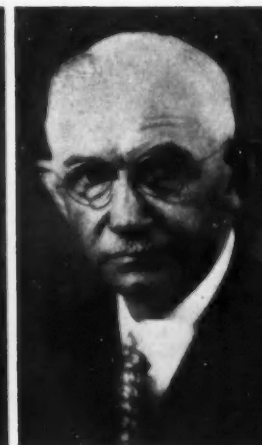
R. S. DAMON



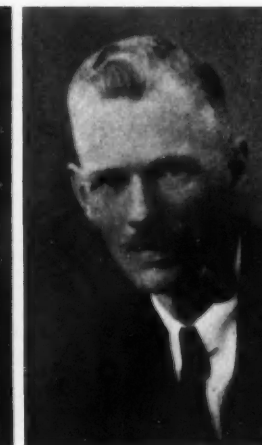
G. A. PAGE



J. H. DOOLITTLE



W. B. MAYO



THOMAS KEMBLE

S. A. E. Production Meeting in Buffalo

Session on Oct. 3 Begins Full Week of Meetings by National Cooperating Organizations

WHEN members of the Society gather at Buffalo during the week of Oct. 3, an exceptional variety of subjects will be presented and discussed at meetings throughout the week in the National Metals Congress and Exposition developed by the American Society for Steel Treating. The week's program includes meetings of the Society of Automotive engineers, the American Society of Mechanical Engineers, American Society for Steel Treating, the American Institute of Mining and Metallurgical Engineers, the American Drop Forging Institute, the Wire Association, the American Welding Society and others which are cooperating.

Monday to Be S.A.E.-A.S.M.E. Day

Monday will be cooperative "Production Day" in the programs of the Society and the American Society of

Mechanical Engineers. The technical sessions will start with the S.A.E. meeting at 10:00 a. m. in the Georgian Room of the Hotel Statler. Vice-President Joseph Padgett, of the Production Activity Committee, has sponsored the program and speakers that have been arranged for by the whole-hearted work of Chairman Joseph Geschelin, of the Production Activity Meetings Committee, with the assistance of the members of his Committee.

The first subject on the program will be presented from individual viewpoints by L. F. Maurer and Alex Taub, both of whom are well known in the automobile industry. They will discuss the manufacturing equipment that is needed in the plant to enable the automotive designer to build his products with the least degree of restriction by manufacturing conditions. The papers and discus-

sion will present many practical manufacturing thoughts from entirely different angles than heretofore and will point the way to greater possible cooperation between the engineering and manufacturing departments.

The second paper will review the progress that has been made in cemented-carbide tools and their application in use. The author, Roger D. Prosser, will supplement the paper with a motion-picture film showing the manufacture of tools of this type and some modern applications.

The third attraction in the program will be a premiere showing of a motion picture that has just been completed, of the production of die castings from special zinc alloys. C. R. Maxon, of the New Jersey Zinc Co., will supplement the film with a description of the alloys and processes shown. The detailed program

(Concluded on p. 18)

Production Meeting Program

Hotel Statler, Buffalo

Monday, Oct. 3

S.A.E. Technical Session, 10:00 A.M.

Convened by **R. F. Peo**, Houde Engineering Corp.

F. A. Cornell, Electro Devices Corp., Chairman

What Manufacturing Equipment Is Required to Meet the Automotive Designer's Needs

L. F. Maurer, Pierce-Arrow Motor Car Co.
Alex Taub, Chevrolet Motor Co.

Current Applications of Cemented - Carbide Tooling (with film)

R. D. Prosser, Thos. Prosser & Son

Special Zinc Alloys in Die-Castings (Premiere showing of film)

C. R. Maxon, New Jersey Zinc Co.

Luncheon Session, S.A.E. and A.S.M.E., 12:30 P.M.

Convened by **M. A. Thorne**, Chairman Buffalo Section, S.A.E.

Joseph Geschelin, Chairman S.A.E. Production Activity Meetings Committee, Chairman

Adjusting Equipment to Current Conditions
K. H. Condit, McGraw-Hill Publishing Co.

Into the Air in Ships

EVERY indication points to the fact that, as industry comes back and becomes active once more, it will be a battle of ingenuity and intelligence rather than one of financial power or previous background. The experimenter, inventor, individual designer and enthusiast with small capital will, during this period, have a chance to bring back to industry some of the romance which it has lost during the bankers' period.

In no part of industry is this more true than in aviation. In spite of trying business conditions, experimentation and research have gone ahead to a point where today we are able to do things unthought of at the time when stock prices, rather than engineering formulas, were dominant.

The aviation industry has got back to work. It is smaller but with a fighting spirit which it never had before, and with a list of facts to build upon which makes its progress more than certain.

We who are in aviation for aviation's sake, and who therefore do not intend to drop it at the first bad flurry, expect great things of it as an industry, and soon. Never before was there such pronounced opportunity for the automotive engineer in every field as there is today; but particularly in the development of that industry which goes up into the air in ships.

Cordially yours,



President, Stout Engineering
Laboratories, Inc.

W. B. STOUT



S. A. E. Vice-President
Representing Aircraft Engineering

A New Deal in Engines

C. L. LAWRENCE



S.A.E. Vice-President
Representing Aircraft-Engine Engineering

COMMENCING with the development of the automobile, and later in the development of the aircraft engine, practically without exception, over a period of more than 40 years, the engines used have been of the spark-ignition, four-cycle, carbureter type originally known as the Otto cycle. This engine type has persisted with very little change in principle but with great improvement in detail.

It looks now as if in both aircraft and automobiles we are rapidly approaching the time when a great many modifications in this engine will take place, or where possibly an entirely different form of engine, such as the compression-ignition type in both two-cycle and four-cycle models, may eventually supersede it.

There are two schools of thought: the first, which seems most prevalent in this Country, is that the four-cycle, spark-ignition, carbureter engine has reached such a degree of perfection that it will be very hard to induce the public to accept anything else and that it can be further improved and modified so as to maintain its position of leadership.

The use of superchargers is becoming increasingly popular in aircraft engines and even is being adopted in some high-class motor-cars; and the idea of abandoning the carbureter in favor of solid-fuel injection either into the inlet manifold or directly into the cylinder probably will come into vogue, with greatly improved distribution and horsepower.

Experiments at Langley Field with greatly overlapping inlet and exhaust valves, in conjunction with supercharging and solid injection, show that great improvement in power output can be made in both aircraft and automotive engines. In addition, the development and use of so-called safety fuels will lead to much less fire risk than obtains at present.

Another school of thought, which is more prevalent in Europe than here, is that the compression-ignition engine is the coming powerplant for all automotive vehicles. This is manifested in this Country most strongly in experiments on motor-trucks and motorcoaches in which the Diesel, or compression-ignition, engine is being substituted for the older type.

The compression-ignition engine lends itself to two-cycle operation so well, as has been demonstrated in large ship and stationary powerplants, that many believe that the engine of the future will be of this type. That the weight of such an engine need not be excessive has been demonstrated to a certain extent by Junkers, whose double-piston two-cycle engine does not weigh per horsepower too much more than the average aircraft engine.

What the future will bring is hard to predict, but it is certain that the present type of aircraft and automobile engine is passing in favor of new and improved types which will lower the cost of commercial transportation and increase its speed and efficiency.

Sincerely yours,

Charles L. Lawrence

President and General Manager,
Lawrence Engineering & Research Corp.

Cordial Canadian Welcome Awaits Transportation Men

Toronto Meeting in October Offers Variety of Engineering from Ventilation, Refrigeration and Legislation to Tires, Fuels and Economics

WITH the optimistic turn in business affairs, the Transportation Meeting this year promises to be better attended and of more far-reaching effect than was anticipated when plans for it were initiated. The program as published herewith is almost complete and represents the selection of topics and speakers as made by Chairman A. F. Coleman, of the Transportation and Maintenance Activity Meetings Committee, and the members of his Committee, with the cooperation of Chairman L. R. Buckendale and the members of the Motorcoach and Motor-Truck Activity Meetings Committee.

Concerning Reservations

The meeting will be at the Royal York Hotel in Toronto, Can., Oct. 4 to 6 inclusive. Five technical sessions have been so arranged as to enable members and others coming from a distance to arrive conveniently in time for the first session and to leave early on the last evening.

The accompanying dinner reservation application should be filled in and returned with remittance to the Society's office in New York City as promptly as possible. Table reservations will be made in the order in which applications are received. Dress will be informal except for guests at the speakers' table.

The informal luncheons at noon on Tuesday and Wednesday are a new feature. There will be no table reservations. Tickets at \$1 per plate for each luncheon will be available beforehand at the S.A.E. registration desk.

Members and guests should make hotel reservations in advance directly with their hotel. At the Royal York, single rooms are \$4 and double rooms \$7 per day, European plan.

Customs

Those going to the meeting from points outside of Canada will meet the Canadian customs inspectors at their ports of entry into Canada, and, when returning, will meet the American customs inspectors at the ports of entry into the United States. Those entering Canada with articles that are subject to American duty will avoid inconvenience and possible delay by registering such articles with the American customs officials at the port of departure from the United States when entering Canada. Goods purchased or acquired in Canada up to the value of \$100 may be brought into the United States duty free but must be declared. Receipts for purchases should be retained for this purpose.

All who cross the border should familiarize themselves with customs and immigration regulations before proceeding.

Other National Groups to Participate

Many members of the Society who are actively engaged in motor transportation also have interests in other National groups, such as the American Petroleum Institute, the American Electric Railway Association, the National Association of Motorbus Operators and the National Electric

Light Association. With the object of bringing together as many as possible of these groups so as to foster their mutual interests, a cordial invitation has been extended to their members to attend and take part in the meeting.

The officers and members of the Society's Canadian Section are looking forward to making the Toronto gathering one of the largest and best Transportation Meetings ever held by the Society. It is well to remember that our Canadian members have demonstrated their superior ability to hang up fine records of hospitality. They are cooperating most effectively with Vice-Presidents A. S. McArthur and B. B. Bachman, of the Transportation and Maintenance and the Motorcoach and Motor-Truck Activities, respectively, and with Chairmen A. F. Coleman and L. R. Buckendale, and the members of the Meetings Committees of these Activities.

The diversified subjects to be presented and discussed will make available interesting and valuable data and information drawn from the experience and observations of leading transportation men which can be applied by the technical and executive supervisors of virtually all types of motor-vehicle transportation operations, both large and small. With the promised wealth of ideas to be provided at the meeting for the benefit both of individuals and of the companies they represent, a large and representative attendance is expected from manufacturing and operating groups throughout the United States and Canada.

Program of 1932 Transportation Meeting

Royal York Hotel, Toronto, Canada

Oct. 4 to 6

TUESDAY, OCT. 4

Technical Session—10:00 A.M.

F. C. Horner, General Motors Corp., Chairman
Ventilation of Motorcoach and Motor-Truck
Bodies—W. J. Cumming, Surface Trans-
portation Corp.

Mechanical Refrigeration of Motor-Trucks—
Harry Williams, Frigidaire Corp.

Luncheon—12:30 P.M.

B. B. Bachman, Autocar Co., Chairman
How Motor-Truck Operators Meet Regulation
—H. C. Kelting, Secretary, Motor Truck
Club of Kentucky; Chairman, Motor Truck
Executives of America.

—Everett Hoar, Hoar Transport Co., Ltd.
Vehicular and Personal Accident Prevention—
J. P. Bickell, Registrar, Province of On-
tario.

Another speaker to be announced.

Banquet—"Old English" Dinner—7:30 P.M.

A. N. Bentley, Chairman Canadian Section,
S.A.E., Chairman

T. A. Russell, President, Willys-Overland, Ltd.,
Toastmaster

Address—His Worship, William J. Stewart,
Mayor, City of Toronto.

Principal Speaker—To be announced.

Humorist Speaker—Burdick A. Trestrail, Vice-
President and Managing Director, The
Echophone Co. of Canada, Ltd.

WEDNESDAY, OCT. 5

Technical Session—10:00 A.M.

T. L. Preble, S.P.A. Truck Corp., Chairman
Control of Motor-Vehicle Transport Operations
—F. I. Hardy, F. I. Hardy, Boston.

Selling Motor-Truck Transportation—R. D.
King, Metropolitan Distributors, Inc.

Luncheon—12:30 P.M.

L. V. Newton, Byllesby Engineering & Manage-
ment Corp., Chairman

Economies of Oil Reclamation — George T.
Hook, *Commercial Car Journal*.

—R. A. L. Bogan, Greyhound Corp.

Use of Employee-Owned Cars in Business—
John M. Orr, Equitable Auto Co., repre-
senting National Electric Light Associa-
tion.

—Canadian speakers to be announced.

Technical Session—8:00 P.M.

M. C. Horine, International Motor Co.,
Chairman

Legislative Regulation of Motor-Vehicles and
Its Effect on Their Design and Operation

—T. H. MacDonald, Chief, Bureau of Pub-
lic Roads, Department of Agriculture.

—Pierre Schon, General Motors Truck Co.

THURSDAY, OCT. 6

Technical Session—10:00 A.M.

F. K. Glynn, American Telephone & Telegraph
Co., Chairman

Automotive Engines and Their Fuels—Dr.
Graham Edgar, Ethyl Gasoline Corp.

Pneumatic Tires—Old and New—Burgess Dar-
row, Goodyear Tire & Rubber Co.

Technical Session—2:00 P.M.

A. G. Herreshoff, Chrysler Corp., Chairman
Six-Wheel Trucks—A. M. Wolf, Consulting En-
gineer, New York City.

The Business of Motor-Vehicle Fleet Operation
—E. E. LaSchum, Railway Express Agency,
Inc.

PLANT VISITS (Registration Necessary)

Tuesday, Oct. 4, 2:00 P.M.

Toronto Transportation Commission's Plants
and New Motorcoach Terminal.

Wednesday, Oct. 5, 2:00 P.M.

Miscellaneous Plant Visits.

GOLF (Registration Necessary)

Tuesday, Oct. 4, and Wednesday, Oct. 5— Royal York Golf Course

Buses will be provided through the courtesy of
the Toronto Transportation Commission.

Order of Receipt.....

Application for Tickets

\$3.00 per Plate

1932 TRANSPORTATION DINNER

TUESDAY, OCT. 4, 7:30 P.M.

Canadian Section, Host

ROYAL YORK HOTEL BALL ROOM

Society of Automotive Engineers, Inc.,
29 West 39th St., New York City

Tables Seat 6

Enclosed is my remittance of \$..... for tickets for the Dinner.

NAME.....

Please mail tickets to my address.....

ADDRESS.....

Hold tickets for me at the meeting.....

Please remit with reservation. No cancellations or refunds after 12:00 M., Monday, Oct. 3. Dress: informal except at Speakers' Table.

ROYAL YORK GOLF COURSE

Please arrange transportation for me to the course as checked. Tuesday, Oct. 4..... Wednesday, Oct. 5.....

S. A. E. Production Meeting in Buffalo

(Concluded from p. 13)

for this session is given elsewhere in this issue of THE JOURNAL. Following this session, a buffet luncheon arranged jointly by the Society and the A.S.M.E., will be served in the parlors adjoining the meeting room. A feature of the luncheon, at which Chairman Geschelin, of the S.A.E. Production Activity Meetings Committee, will preside, will be a short paper on Adjusting Equipment to Current Conditions, prepared by K. H. Condit, of the McGraw-Hill Publishing Co. This will be followed by general discussion as time permits before the beginning of the afternoon session.

The A.S.M.E. Machine-Shop Practice Meeting will then be held at 2:30 and 8:00 p. m. at the hotel. Papers on speed characteristics of high-speed presses, torque required to tap cast iron, and trends in machine-tool design will be presented in the afternoon. At the evening session, size control in precision grinding, die castings for machine parts, and materials for modern cutting-tools will be discussed.

Steel-Treating and Metallurgical Sessions

The program of the American Society for Steel Treating includes about 27 technical papers for discussion at A.S.S.T. sessions throughout the week. The large variety of A.S.S.T. papers scheduled cover metallurgical research, design, application and performance of various materials. Typical papers to be presented are entitled, Corrosion Resistance of Iron-Chromium Alloys in Various Media—The Salt Spray Test, Internal Friction in Iron and Iron Alloys, An Interpretation of the Deep Acid-Etch Test as Applied to Tool Steels, Lubrication of Deep-Drawn Sheet-Metal Parts, and Heat-Treating Steel for Forging.

The program prepared by the American Institute of Mining and Metallurgical Engineers includes technical sessions on Wednesday and Thursday at which most of the papers will relate to non-ferrous-metal topics such as internal stress

on properties of drawn-brass tubes, the copper-rich alloys of the copper-nickel-tin system and a science lecture on the application of new amplifying tubes to control mineralogical and metallurgical processes.

The program of the American Welding Society commencing Monday afternoon includes a number of sessions dealing with research and practical applications bearing on welding of both ferrous and non-ferrous metals. Several of these papers undoubtedly will be of direct interest to automotive manufacturers.

National Metals Exposition

The National Metals Exposition is always a most interesting and valuable feature of the National Metals Congress. More than 125 companies,

the products of most of which are of direct interest to the production executive and engineer, will be represented by displays at the 174th Regiment Armory on Niagara Street in Buffalo not far from the hotel. The exposition will open only during the afternoons to registered members of the Societies cooperating in the week's program, thus leaving the mornings free for members to attend a choice of technical sessions of the several Societies.

Reduced Railroad Fares

All members of the Society attending the meetings and exposition scheduled for the week are entitled to reduced railroad fares to Buffalo and return. Reduced-fare certificates may be obtained by members on application to the Society's office in New York City. Members should make their own reservations for accommodations at the hotel.

To Cooperate on Highway Safety

State Motor-Vehicle Administrators Meet Engineers and Plan Regular Interchange of Views

ADDITIONAL cooperative measures to advance highway safety were outlined at a meeting of committees appointed by the Eastern Conference of Motor-Vehicle Administrators and the National Automobile Chamber of Commerce, held at the headquarters of the Chamber in New York City on Aug. 23.

While fully aware that increased safety must come largely from better traffic control and from greater care on the part of the motor-car drivers, it was agreed that there is a mutuality of interest between the law-enforcement officers and the manufacturers of cars, trucks and motorcoaches that could be made effective in the direction of decreasing highway accidents.

The commissioners, who in this Conference represent 18 States with approximately 12,000,000 motor-vehicles, declared that if changing designs in motor-cars are brought in advance to the attention of the motor-vehicle commissioners, this will permit early consideration of the necessary legislation for control of the new vehicles.

A number of the manufacturers offered their laboratories and proving grounds for tests that will furnish the administrators with the necessary information in connection with proposed laws on safety. Technical facilities and full cooperation of the Society also were offered.

Representing the Eastern Conference of Motor-Vehicle Administrators were: Robbins B. Stoeckel, Commissioner of Motor Vehicles of Connecticut, who acted as chairman of the committee; Benjamin G. Eynon, Commissioner of Pennsylvania; Harold G. Hoffman, Commissioner of New Jersey; and W. A. Vanduzer, Commissioner for the District of Columbia.

The manufacturers' committee, representing the National Automobile Chamber of Commerce, includes the following, all active members of the Society: Delmar G. Roos, of the Studebaker Corp., who acted as chairman of this committee; George Allen, of the Chrysler Corp.; W. J. Davidson, of the General Motors Corp.; L. S. Sheldrick, of the Ford Motor Co.; and Alfred Reeves, vice-president of the National Automobile Chamber of Commerce.

Guests who attended by invitation were: John A. C. Warner, General Manager of the Society; David C. Fenner, chairman, and R. S. Armstrong, of the Motor-Vehicle Conference Committee; James J. Shanley, Chief Inspector of Motor Vehicles of New Jersey; and Herbert L. Crapo, of the Motor Vehicle Research Department of the State of Connecticut.

After further fact-finding surveys on the part of each committee, another joint session will be held next month.

Northwest Section Passes Philadelphia

Membership Applications Obtained Total More Than 90 Per Cent of Section Quota

AFTER leading the field for the entire race in the percentage of its quota obtained in applications, the Philadelphia Section was forced from the lead in the last two days of the competition by the Northwest Section, whose final spurt brought it within 7 per cent of a perfect score. The Section is congratulated upon its fine showing. In offering these congratulations, we are not overlooking the splendid record of the

Philadelphia Section and the great amount of energy that its members expended in keeping the lead so long. We anticipate that the interest and pride of the members of these Sections will cause them to continue their efforts, to the end that their membership will constantly increase and the Sections benefit accordingly.

While the membership campaign closed on July 31, so far as the receipt of applications to be considered for the awards is concerned, it is gratifying to note that the flow of applications has been maintained and the work of the various Sections' Membership Committees is continuing.

Although the number of applications received from Sections and individuals is not an indicator of probable results in the contest, the relative standing of Sections and individuals has been tabulated each month on the basis of both the applications received and the actual new members obtained. In the last analysis, the number of new members is the deciding factor in the determination of the awards. Herewith are presented the final relative standings of the Sections, based on percentages of their quotas, as represented by applications, and of individuals, based on the number of applications they have secured. These standings are computed from the number of applications that are to be considered in determining the awards.

Awards To Be Made on Number of Paid-Up New Members

The fact should be remembered, however, that, under the rules governing the contest and the awards, a new member is defined as one whose application has been received during the allotted time, who has been duly elected and who has qualified by payment of his initiation fees and dues within three months after his election.

All applicants must pay their initiation fees and dues before the expiration of 90 days after notice of their election if they are to be counted by the Committee in determining the various winners. After the expiration of the 90 days, the applications of those who have been elected but failed to pay must be placed before the Council for re-

approval, and this automatically bars the application from consideration in the determination of the awards.

Although considerable time must elapse before either the Section or individual winners of the awards can be determined under the rules, the relative positions as of Aug. 22 are of interest. These are given herewith but undoubtedly they will change many times before the final winners are known.

APPLICATIONS RECEIVED

(To Aug. 22)

From SECTIONS

(Expressed in Percentage of Quota)

1 Northwest	93.5
2 Philadelphia	77.5
3 Indiana	52.5
4 Baltimore }	41.4
4 Canadian }	
5 Detroit	33.9
6 Chicago	31.6
7 Southern California	31.0
8 Kansas City	30.9
9 Pittsburgh	27.9
10 Metropolitan	24.7
11 Syracuse	15.5
12 Washington	15.0
13 New England	14.6
14 Buffalo	13.1
15 Cleveland	13.0
16 Wichita	11.8
17 St. Louis	11.3
18 Dayton	10.8
19 Milwaukee	10.7
20 Northern California	8.0
21 Oregon	7.5

From INDIVIDUALS

(Relative Standing Based on Applications Sent In)

First Place

John F. Hardecker

Second Place

R. N. DuBois

Third Place

Reese Lloyd

Tied for Fourth Place

C. C. Mathis L. M. Porter

Tied for Fifth Place

J. G. Holmstrom P. J. Kent

L. V. Newton C. O. Richards

O. M. Thornton

Tied for Sixth Place

A. Gelpke H. M. Jacklin

NEW MEMBERS OBTAINED

(Elected and Paid Up)

SECTION STANDING

(Expressed in Percentage of Quota)

1 Philadelphia	24.6
2 Canadian	24.1
3 Indiana	22.6
4 Baltimore	15.7
5 Southern California	14.0
6 Metropolitan	13.8
7 Chicago	13.3
8 Detroit	12.9
9 Syracuse	12.1
10 Kansas City	11.9
11 Pittsburgh	11.6
12 Northwest	8.3
13 Buffalo	6.7
14 St. Louis	6.5
15 Northern California }	6.0
15 Washington }	
16 Wichita	5.9
17 Cleveland	5.8
18 Dayton	5.4
19 Milwaukee	2.4
20 New England	0.9
21 Oregon	0

INDIVIDUAL STANDING

(For Individual Awards)

Tied for First Place

L. R. Joslin L. M. Porter

Tied for Second Place

F. K. Glynn R. N. Janeway

C. C. Mathis G. O. Pooley

C. C. Stewart R. R. Teetor

O. M. Thornton

Tied for Third Place

R. H. Combs Capt. M. R. Cox

A. Gelpke J. F. Hardecker

J. G. Holmstrom Walter Keys

C. G. Krieger B. J. Lemon

L. V. Newton Alex Taub

Chronicle and Comment

Northwest Achieves 93% of Quota

GRANTING that the last word has not as yet been written into the story of the Get-Your-Man campaign's success, it is nevertheless none too soon to congratulate the officers and members of our Northwest Section for bringing in 93 per cent of their membership quota in terms of applications. As noted elsewhere in this issue, all Sections and many members outside Section territory have cooperated effectively in accomplishing excellent results of far-reaching importance. The by-products of the enterprise are, and will continue to be, as significant and valuable as are the direct benefits shared by all concerned.

Appreciation of Aeronautic Meeting Efforts

AS THIS number of the S.A.E. JOURNAL is issued, the Aeronautic Meeting held during the National Air Races in Cleveland comes to a close. This issue is published as the Aeronautic Meeting Number and contains three of the papers presented in Cleveland on a variety of aeronautic subjects—aerodynamics, engines and air transportation. Appreciation is hereby expressed to the authors, chairmen, toastmaster and speakers and to the Cleveland Section for the energy, time and cooperation that they so kindly contributed to make this Aeronautic Meeting another outstanding success.

Transportation Men Going to Toronto

ON OCT. 4 TO 6 inclusive, the 1932 Transportation Meeting of the Society will be in full swing at Toronto. The program includes five technical sessions, the Transportation Dinner, luncheon discussions, plant visits and golf arranged for by the Canadian Section. The wide range of subjects to be discussed will be presented by men who are leaders in the business of motor-vehicle transportation. The whole meeting has been designed by the Transportation and Maintenance Activity, with the cooperation of the Motorcoach and Motor-Truck Activity, to be of vital interest to both the operators and the manufacturers of motor-trucks and motorcoaches. Complete details regarding the meeting will be found elsewhere in this issue of the S.A.E. JOURNAL.

Production Meeting During National Metals Congress

THE S.A.E. Production Meeting in Buffalo on Monday, Oct. 3, will afford exceptional opportunity for production men to get a wealth of information. The week is to be devoted to meetings of the American Society for Steel Treating, American Society of Mechanical Engineers, American Welding Society, American Institute of Mining and Metallurgical Engineers, the Wire Association and the

American Drop Forging Institute. The National Metals Exposition at the 174th Regiment Armory will be open each afternoon. Members of the Society are entitled to reduced railroad fares to the meeting and return. More complete information is given on p. 13 of this issue of the S.A.E. JOURNAL.

L-127 What a Man!

I HAVE just enough brains to keep my mouth shut, my ears open, and present good executive appearance. Do you need a front for your business?—L-127, Herald Tribune.

IN commenting upon the above "ad," which recently appeared in a New York paper, someone opined that the person who had the imagination and ingenuity to compose the inquiry could be expected to amount to more than the "stuffed shirt" qualification would indicate.

Establishing a new connection these days is likely to involve considerable salesmanship of the highest order. Some are accomplishing real results by exercising their originality in demonstrating that their engineering talents can be profitably employed in places heretofore unsuspected. At least one member of the Society, deciding that "there just aren't any jobs," deliberately made one for himself by analyzing the needs of a certain company and then convincing the officials that he could more than fulfill the requirements and bring them a profit. In other words, he did a job of market analysis before applying for the position.

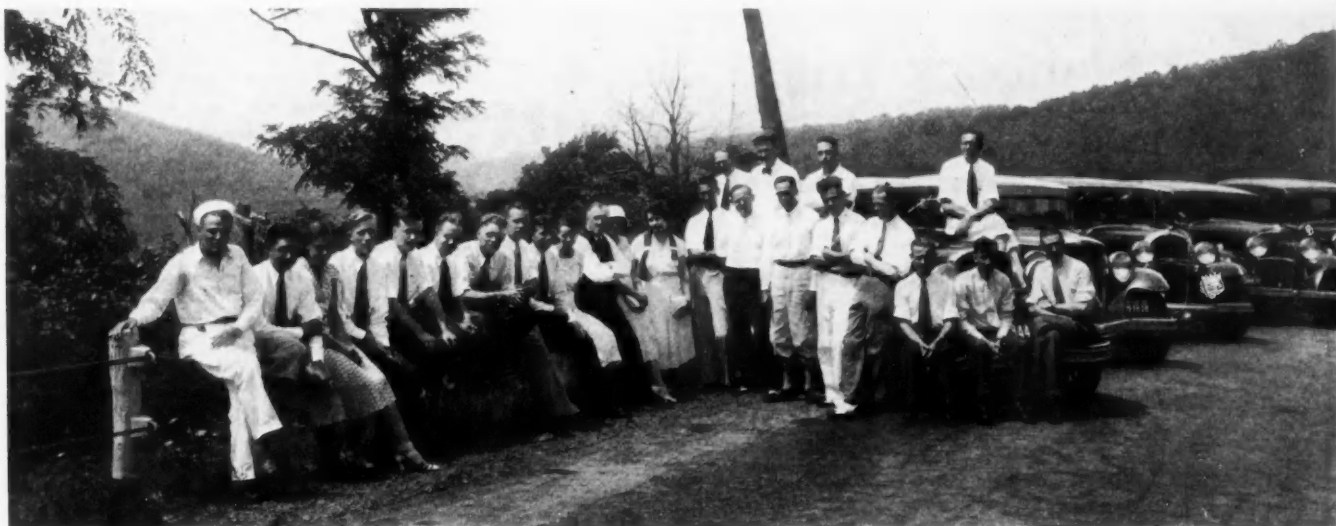
All of which leads to the statement, repeated many times in these columns and elsewhere, that the Society's Employment Service is open to the free use of members and of persons who have openings for the highest type of engineering talent. Naturally, there are many more applicants than positions. All the more reason why it is urged that advantage be taken of the Service by those who employ.

Transactions Are Coming

COPIES of Vol. 25 and 26 of the Society's TRANSACTIONS, covering the years 1930 and 1931, will be mailed in the near future to those members who filed their requests in accordance with the ruling of the Council.

The book contains 96 papers that were presented at general and Section meetings of the Society, 47 papers coming from the 1930 grist while the remaining 49 represent the 1931 contribution to automotive engineering literature. Approximately 700 pp. are included in the book; references direct the reader to the issues of the S.A.E. JOURNAL in which important items of discussion were printed.

With the new over-run principle in effect, it will be possible to publish future volumes of TRANSACTIONS early in each calendar year.



Cooperative Fuel Research at Uniontown

DURING the first three weeks of August a very active group of research men has been busy on Uniontown Hill in Pennsylvania recording observations of actual engine knock to determine the deviation of road-test results from results obtained in the laboratory by the standard procedure on the C.F.R. knock-testing engine. While theorists engage in a battle of words on the subject of detonation, these experienced technologists, with trained operators, have been charging their automobiles up Uniontown Hill.

Fourteen of the leading petroleum and automotive laboratories cooperated in these road tests, which included 15 popular makes and models of cars and 15 representative fuels.

The tests were conducted under the direction of the road-test correlating group of the C.F.R. Detonation Subcommittee.

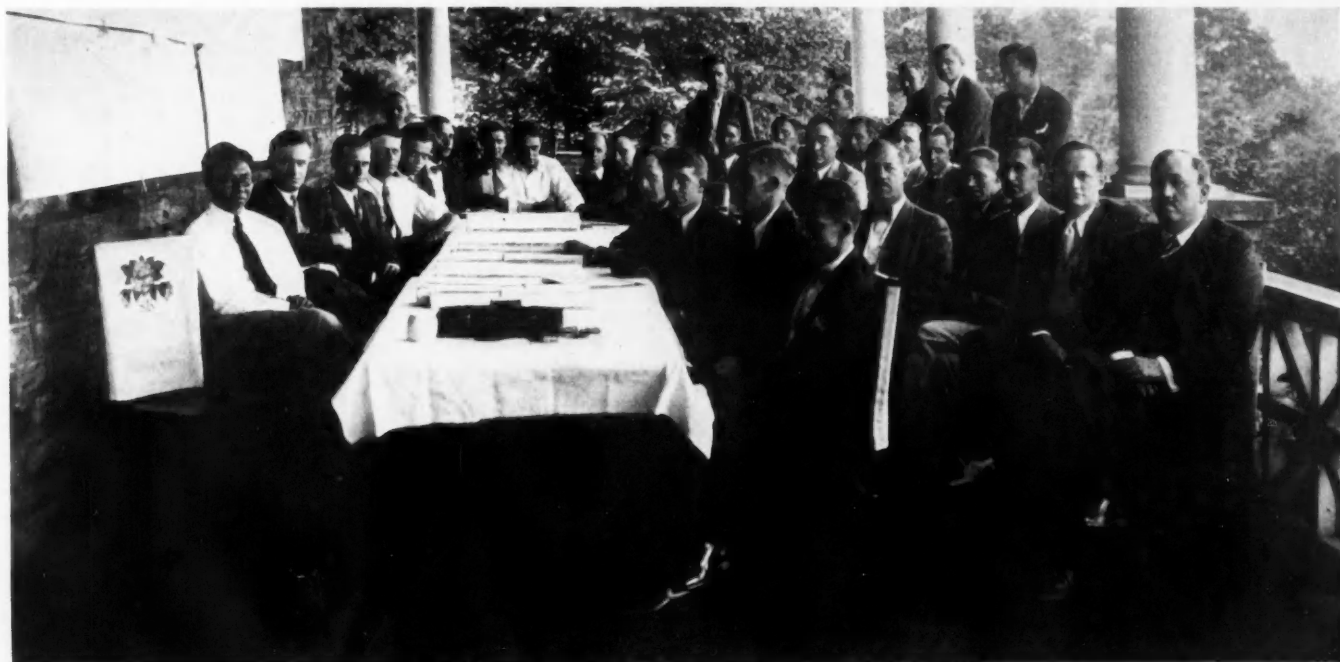
Some indication of the magnitude of the work accomplished can be gained from the statement that in these tests the cars were driven approximately 15,000 miles, which is equivalent to 2500 runs up the hill, consuming 350 gal. of sample fuels and 400 gal. of reference fuels. About 10,000 observations of knock were recorded, and all results will represent the findings of at least two groups of men, some of three or four groups, with usually three men to a group.

Following a preliminary analysis of the great volume of data collected and

as a result of discussion at a series of meetings held at short intervals throughout the three-week period of test work, the Committee unanimously agreed to recess and reconvene on Aug. 22 in the laboratory of the Waukesha Motor Co., where facilities were made available for laboratory engine-tests.

As this issue of the S.A.E. JOURNAL goes to press, the members of the Committee are gathered in Waukesha, Wis., where they are engaged in this work toward formulating a procedure for the C.F.R. engine.

A satisfactory working method for conducting antiknock tests is the goal that the C.F.R. Detonation Subcommittee hopes to reach as a result of this undertaking.



ROAD-TEST CORRELATION MEETING OF C. F. R. DETONATION SUBCOMMITTEE. (ABOVE) TRAINED OPERATORS WITH CARS AT UNIONTOWN

Fort Hancock Entertains Metropolitan Section

Between Boat Trips the Guests Inspect Coast-Defense Equipment, Watch
C. M. T. C. Parade and Dispatch Lobster Dinner

MEMBERS of the Metropolitan Section and their guests made a trip to Fort Hancock, Sandy Hook, N. J., on Friday afternoon, Aug. 12, as guests of Lieut-Col. G. W. Cocheu, commandant of the post. The trip was arranged and ably managed by Capt. W. C. Thee, a member of the Society who is stationed at the fort, where he is in charge of the motor-repair shops of the Second Corps Area under the Quartermaster Corps.

The party left Manhattan at 1 p. m. by boat, sailing down New York Bay and returning by moonlight. At Fort Hancock the party was shown the coast-defense batteries, the guns and mortars mounted on railroad-car trucks, the latest Army trucks, the motor-repair shops and, at the close of the afternoon, watched the Citizens Military Training Camp parade. This was followed by a lobster dinner in the mess hall and finally, just before starting back, by an inspection of one of the Diesel-engine-driven Coast Guard vessels, by courtesy of Commander Stephen Yandle.

Fixed and Mobile Batteries

The coast-defense batteries consist largely of disappearing guns emplaced before the World War, which are still in perfect firing condition. An additional method of providing adequate coast and harbor defense is the use of modern long-range guns and mortars mounted on railroad-car trucks so as to be available for quick concentration at any point and to augment the fixed defenses. The tactics for the transfer of this mobile artillery as required have all been worked out in detail by the railroads. The Coast Artillery also has available guns of smaller caliber which can be tractor drawn. These guns have long range and a high degree of accuracy.

The coast-defense mortars have a shorter range than the guns, but, within their range, are as accurate as the guns are at the same range. They fire a heavier projectile, with deck hits on ships as the chief objective. The visiting party was shown some of the "mechanical mathematics" by which firing is controlled after reports of the position of targets are made from the observation stations. As modern battleships can fire with accuracy at high speeds, the problem of making direct hits on these moving targets at a range well in excess of 20,000 yd. within a few minutes from the sighting of the target is obviously very complicated.

Army Trucks and Repair Shops

The motor-repair shops are a model of systematic and complete organization. A description of the scheme was given before the Society by Lieut-Col. Brainerd Taylor in a paper published in the S.A.E. JOURNAL for November, 1931, together with discussion by General Pope, Colonel Stayer and Captain Thee. Members of the Metropolitan Section will also remember Colonel Stayer's talk last spring on the standardized-truck problem.

Two Army trucks were demonstrated for the visitors. One is a QMC 3-ton four-wheel-drive vehicle developed and assembled by the Quartermaster Corps. It has a Hercules six-cylinder, $4\frac{1}{2} \times 5\frac{1}{4}$ -in. engine, dual 9.75 \times 22-in. rear tires, and single tires on the front, but dual tires can be fitted to the front if necessary. The front-axle joints are of the constant-velocity type. An auxiliary transmission enables an extremely large gear-reduction to be obtained where circumstances require it. On the other hand, a road speed of 50 m.p.h. can be attained. The other vehicle was a QMC 10-ton six-wheel rear-drive truck for carrying heavy ordnance. This has a tandem worm drive to both rear axles and is capable of 40 m.p.h. on good roads, fully loaded; however, it does not have the same ability to pull through soft sand as the four-wheel-drive job. It is driven by a Sterling $5\frac{1}{4} \times 6$ -in. six-cylinder engine of 775-cu-in. displacement rated at 155 hp. at 1800 r.p.m.

Parade of Citizens in Training

About 300 young men from 17 to 25 years of age were in training at Fort Hancock for the month of August. They were divided into four groups—Basic, Red, White and Blue—according to amount of previous experience. No one was accepted for the fourth group who was not regarded as suitable officer material. The four batteries were under the command and instruction of two regiments of reserve officers. The guests witnessed the transfer of command from the first regiment, the 533rd under Colonel Cushing, to the 539th, under Colonel Stoddard, who took it over for the second two weeks of the month. These reserve regiments are really anti-aircraft regiments assigned to duty at Fort Hancock for Coast Artillery training.

Fort Hancock originally was used as an ordnance proving ground, but almost

all of this work has been transferred to Aberdeen Proving Ground.

Section Meetings Calendar

Canadian—Sept. 15

Toronto, Ont.
Joint Meeting with Canadian Automobile Chamber of Commerce.

Indiana—Sept. 15

Indianapolis Athletic Club
Aeronautic Advances

Metropolitan—Sept. 22

A. W. A. Clubhouse, New York City; Dinner 6:00 p. m.
What Aviation Can Do for Motor-Cars—William B. Stout, president, Stout Engineering Laboratories

Milwaukee—Sept. 5-10

Participation in the Great Lakes Power Conference at the Milwaukee Auditorium which is being held under the auspices of the National Association of Power Engineers in conjunction with its 50th anniversary

Northwest—Sept. 8

Dolly Madison Restaurant, Seattle
Insurance—Fred W. Bert, Jr.
Taxation and Highways—Charles C. Finn, manager, John Finn Metal Works, and Chairman Northwest Section

Oregon—Sept. 9

Multnomah Hotel, Portland; Dinner 6:30 p. m.
Valves and Valve Seats—Alex. L. Robb, chief engineer, Jadson Motor Products Co.
Alloy Pistons—Victor Tandy, general manager, Emsco Piston Ring Co.

Southern California—Oct. 1

Sunset Canyon Country Club, Los Angeles
Factors Governing Design of Army Observation Airplane—Fred Herman, aeronautic engineer, Douglas Aircraft Co.
Bridge, golf and tennis in the afternoon; dancing after the meeting

Personal Notes of the Members

Chapin a Cabinet Officer

Gratification is felt in the automotive industry for the appointment by President Hoover of one of its leading members as Secretary of Commerce to succeed Robert P. Lamont, who resigned this Cabinet position on Aug. 3. The appointment is regarded as a recognition of the importance of the automobile industry as a factor in economic recovery and of the ability that Mr. Chapin has so consistently shown. His selection for this responsible Government position is thought to be an indication that Mr. Chapin will be given an important part in the President's program for the rehabilitation of industry and commerce. He had been mentioned before as a probable appointee to an important office in the executive branch of the Government.

Mr. Chapin, who became a member of the Society in 1912 and has been an Affiliate Representative of the National Automobile Chamber of Commerce in the Society since 1917, has been very prominent in the work of the National Automobile Chamber of Commerce for the last 20 years, particularly as chairman of the Highways Committee and President of the N.A.C.C. During the World War he served as chairman of the Highways Transport Committee of the Council of National Defense, and has long been a member of the Highway Education Board, the Lincoln Highway Association and the Michigan Good Roads Association. He is an officer in several Detroit banks.

As president of the Hudson Motor Car Co. from 1910 to 1923 and chairman of the board of directors of the company since 1923, Mr. Chapin has held an outstanding position in the industrial world, to which he rose with romantic rapidity while a young man. His connection with automobiles began when he left the University of Michigan to join the Oldsmobile Co. at the invitation of R. E. Olds. In 1904, when 24 years of age, he was appointed general sales manager of the Oldsmobile Co. Later he organized the Thomas-Detroit Automobile Co., which was succeeded by the Chalmers-Detroit Motor Co., of which he was general manager. He was elected president of the Hudson Motor Car Co. in 1910, when only 30 years of age.

Still a comparatively young man for so important a position as that of Secretary of Commerce and member of the President's Cabinet, Mr. Chapin has a pleasing and forceful personality, a broad and sound knowledge of business affairs and a keen interest in National and civic progress.

Roy E. Cole assumed the duties in August of chief engineer of the Rockne Motors Corp., of Detroit. Prior to this appointment he was a partner in the Vail-Cole Engineering Co., also of Detroit.

Fred A. Cornell, who was a manufacturers' representative in Detroit, has

been appointed manager of the Electro Devices Co., of Buffalo.

Walter G. Craig recently accepted the position of district manager in Fresno for the General Petroleum Corp. of California, which has its head office in Fresno. Previous to this advancement, he was division lubricants representative of the company in Los Angeles.

F. W. Germane has associated himself with the Utilities Automatic Co., of Philadelphia, manufacturer of oil burners, as vice-president and treasurer. Formerly he was a manufacturers' agent at Mount Airy, Philadelphia.



ROY D. CHAPIN

Albert S. Heinrich, of West Orange, N. J., recently severed his connection as engineer with the Bendix Research Corp., of East Orange, N. J.

John St. Hornow, formerly transportation engineer of the Universal Truck Rental Corp., of New York City, is now general manager of the firm of Hornow & Co., of Brooklyn, which was organized recently to handle the maintenance of motor-truck fleets under contracts.

C. M. Kaltwasser, having resigned as vice-president of the Timken-Detroit Axle Co., of Detroit, was elected president and general manager of the Watson Mfg. Co., of Jamestown, N. Y., maker of metal office furniture and screens.

Lawrence J. Kroha is now connected with the Fitzsimons Mfg. Co., of Detroit, manufacturer of metal stampings and tubular products. He was associated for six years with the Harry

Brothers Stamping Co., also of Detroit, which recently was dissolved and ceased operations.

E. J. Laurie, a former student at the Massachusetts Institute of Technology, at Cambridge, Mass., has been appointed a junior engineer by the Chrysler Corp., of Detroit.

Orin Moe, formerly project engineer for the Stearman Aircraft Co., of Wichita, Kan., recently joined the engineering department of Murray & Treurtha, Inc., of North Quincy, Mass.

Leroy Newcomb, who was maintenance superintendent for the Transportation Management Corp., of New York City, recently entered the employment of the Emsco Asbestos Co., of Downey, Calif., as experimental engineer.

John W. Oehrli, after eight years' association with the Lycoming Mfg. Co., has resigned his position as assistant chief engineer in the automotive-engine division to devote the coming year to research and graduate study in the Sheffield Scientific School of Yale University.

Ralph M. Parsons, formerly chief engineer of the Leamon Process Co., of New York City, is now acting as consulting engineer on petroleum refining equipment.

B. M. Smarr, formerly director of standards for the General Motors Corp., in Detroit, is now in charge of service specifications for the Buick-Olds-Pontiac Sales Co. in the same city.

Edwin L. Smith, who was full-size-body draftsman with the Pierce-Arrow Motor Car Co., of Buffalo, now holds a similar position with the Studebaker Corp., of South Bend, Ind.

J. Harry Smith has severed his connection with the fabrikoid division of E. I. duPont de Nemours & Co., by which he was employed as automotive sales manager, with his headquarters in Detroit. Mr. Smith, whose plans for the future are indefinite, had previously had charge of sales for the Rich Tool Co. and had been manager of the automobile body department of the Pullman Co. in Chicago.

W. A. Whatmough has been made director of the Engine Research Co., Ltd., of Twickenham, England, which is engaged in designing engines and combustion heads. Mr. Whatmough's former connection was with the Automotive Engineering Co., also of Twickenham, in the capacity of consulting engineer. Several years ago he came to America to present a paper on combustion-chamber theory and design at the Summer Meeting of the Society in Quebec. This paper, which provoked much discussion, was published in the S.A.E. JOURNAL for September, 1929, p. 249, and in TRANSACTIONS, vol. 24, p. 115.

Aircraft Advancement Revealed in Cleveland

(Concluded from p. 12)

sumed airline, and, fifth, with the effect of several airplane characteristics as measured in earnings. This presentation of the subject is extremely complete and replete with figures supporting the authors' contentions. Mr. Damon closes the paper with four conclusions:

(1) In the case of the fictitious airline chosen, and in the absence of speed competition, it is better economy to use a low speed if any increase must be obtained by the use of more power alone.

(2) It is excellent economy to increase speeds by improving the aerodynamic efficiency of the flying equipment. On the basis of the assumptions made for the average airplane, the earning value per year of 1 m.p.h. in cruising speed approximates \$500 per airplane.

(3) It is economically sound and advisable to replace obsolete flying equipment with a more-efficient type before the obsolete equipment has been used for its full life, provided the total operating costs of the new equipment are enough less to justify such a change.

(4) It is economically advantageous to seat

as many passengers as possible in each airplane as long as a satisfactory schedule frequency can be maintained and provided the price paid per pound of additional payload does not exceed a fixed amount, which can be determined by an analysis such as that presented. In the example chosen as an average airplane on an average airline, this price approximates \$25 per lb.

This paper is highly recommended to those who are interested in the study of the economics of airline operation.

Amelia Earhart To Address Dinner

The Society is justly proud of those women who have the attributes and qualifications to become its members. A large measure of this pride is vested in Amelia Earhart, whose accomplishments need no chronicling here. The fact that she consented to speak at the Aviation Dinner held by the Society jointly with the Aeronautical Chamber of

Commerce and with the cooperation of the Society's Cleveland Section, is indicative of her interest in the Society and the Society's interest in her.

Arrangements were made for the second speaker of the evening to be William B. Mayo, known not only as former chief engineer of the Ford Motor Co., but also for his extensive interest in aviation and the development of transport planes.

The pilot of the dinner, Major James H. Doolittle, also needs no introduction. His accomplishments over the last several years stamp him as one of the most prominent airmen and at the same time an accomplished engineer in his field.

The conduct of the technical sessions was entrusted to C. J. McCarthy, chief engineer of the Chance Vought Corp.; Robert Ins'ey, vice-president of the Continental Aircraft Engine Co.; and Luther Harris, assistant to the president of American Airways, who acted as chairmen of the Airplane Structures, Powerplant, and Transport-Plane Sessions respectively.

Ray Austin Graham

AUTOMOTIVE circles were greatly shocked by the deplorable sudden death of Ray A. Graham in Canada in mid-August as a consequence of illness from which he had suffered for some time. Mr. Graham was the youngest of the three brothers who have in the last 15 years built up together industrial enterprises of prominence in the motor-truck and passenger-car fields. He had a leading part in these organizations, which reflected the personal characteristics that won for him the admiration of a host of friends. His membership in the Society dates from February, 1917, when he was admitted as an Associate Member. At that time he was secretary-treasurer of the Graham Glass Co., of Evansville, Ind.

Mr. Graham was a native Hoosier, born at Washington, Ind., in 1887, and was graduated from the University of Illinois in 1908 with the degree of Bachelor of Science. He became interested in farming and prior to entering the motor-truck industry was manager of Graham Farms and was interested in farm tractors in a commercial way.

When the three brothers formed the company of Graham Bros., Inc., in Evansville, for the manufacture of trucks about the time of the World War, Ray A. Graham was elected secretary-treasurer. In 1921 he was treasurer and general manager. From 1922 to 1927 he was treasurer. Following disposal of the truck business to Dodge Bros., he went to New York City and in 1930 became president of the Graham Bros. Corp. When the Paige-Detroit

Motor Car Co. was purchased by the Graham brothers in 1927, the Graham-Paige Motors Corp., of Detroit, was organized, with Ray Graham as secretary-treasurer, a dual office that he held at the time of his death.

Since 1926, when Mr. Graham made his headquarters in New York City, he was a member of the Metropolitan Section of the Society.

Albert C. Bergmann

IN the passing away on Aug. 6 of Albert C. Bergmann, president and general manager of Bumpers, Inc., of New York City, the Society lost one of its very early members and one who had been active in the affairs of the Society and the Metropolitan Section. Mr. Bergmann was elected to Member grade in 1907, his application bearing the serial number 63 and giving as references Thomas J. Fay, E. T. Birdsall, A. J. Moulton, G. E. Franquist and J. M. Ellsworth.

Mr. Bergmann was graduated in machine design in 1906 by Cooper Union, in New York City, after which he practiced machine-shop drafting for a number of years. Since 1910 he was connected successively with the Fiat Automobile Co., of Poughkeepsie, N. Y.; with Wyckoff, Church & Partridge, of Kingston, N. Y., as production manager; with the Mercer Automobile Co., of Trenton, N. J., as superintendent; with the Standard Parts Co. as New York branch manager; with the Sterling Motor Truck Co. as Eastern district manager and vice-president and

general manager; with the C. G. Spring & Bumper Co. as general manager; and, since 1929, with Bumpers, Inc., as president and general manager.

As early as 1911 Mr. Bergmann was appointed a member of the Lock-Washer and Miscellaneous Divisions of the Standards Committee, on which he served for three years; in 1913 he was also a member of the Springs Division, and in 1918 was a member of the Sheet-Metal Division. In 1920 he served on the Membership Committee of the Society and in 1927 on the House Committee. He was Treasurer, Vice-Chairman and Chairman of the Metropolitan Section respectively in 1918, 1919 and 1920.

Charles E. Watterson

THE death of Charles E. Watterson, president and general manager of the Sheffield Machine & Tool Co., of Dayton, Ohio, has been announced with profound regret by the company. In his passing, the Society lost an Associate Member of 13 years' standing, Mr. Watterson having been admitted in June, 1919.

Mr. Watterson had held the offices of president and general manager of the Sheffield company for the last 16 years. He was born at Cleveland in 1871 and received his academic education at Western Reserve University in that city. From 1897 to 1901 he was employed by the Foote-Burt Co., of Cleveland. Then for 15 years he was a traveling salesman for the E. A. Kinsey Co.

and the W. M. Pattison Supply Co., and in 1916 he was elected president of the Sheffield Machine & Tool Co. Besides his membership in the S.A.E., Mr. Waterson was an associate member of the Engineers Club of Dayton.

Jack E. Foster

AN automobile accident at Saginaw, Mich., resulted in the death recently of Jack E. Foster, who was on a return trip from Dayton, Ohio, where he had gone to interview the engineers at Wright Field. At the time of the accident, he was employed in the engi-

neering department of the Dow Chemical Co., of Midland, Mich.

Mr. Foster, who was elected to Member grade in the Society in June, 1929, was born at Slater, Mo., in 1898, and was self-educated in engineering. From 1918 to 1927 he was employed as a mechanical engineer and designer successively by the Kansas City Oxygen Gas Co., of Kansas City, Mo.; Wharton Motors, of Dallas, Tex.; the Hugh L. Thompson Engineering Co., of St. Louis; and the National Steam Automobile Co., of St. Louis.

During the World War, Mr. Foster studied aviation in the ground school at the University of Illinois and subsequently was commissioned a lieutenant

as a reserve officer in the Air Corps. In 1927 he was appointed chief engineer of the American Eagle Aircraft Corp., of Kansas City, for which in the next two years he secured approved-type certificates on seven airplane designs.

In 1929 Mr. Foster was conducting laboratory experiments on an all-metal sparless plane, seam and spot welded electrically. Later that year he was connected with Rearwin Airplanes, Inc., of Kansas City; then in 1930 he organized and became chief engineer of the Cross-Foster Aircraft Co., of the same place, but last year he formed the Foster Aircraft Co., of Alliance, Ohio, of which he was chief engineer.

Applicants for Membership

ANGELL, W. R., JR., research engineer, Continental Motors Corp., *Detroit*.

ASKREN, J. A., research assistant, Purdue University, *Lafayette, Ind.*

BAUER, PAUL, instructor in airplane and airplane-engine design, Purdue University, *Lafayette, Ind.*

BEEDE, VIRGIL ORLANDO, chief engineer, Heat Controlled Motor Co., *Minneapolis*.

BENNETT, L. C., special representative Goodyear Tire & Rubber Co., *Seattle*.

BENSON, CARLOS F., Cadillac Motor Car Co., *Detroit*.

BIGBY, PAUL STEVENS, assistant head, automotive engineering department, Universal Oil Products Co., *Riverside, Ill.*

BURKE, JOSEPH E., district manager, International Chemical Co., *Philadelphia*.

BURWELL, DAWSON A., Corbitt Motor Truck Co., *Henderson, N. C.*

CAMBRIDGE, H. O., service manager, Chehalis Garage, *Chehalis, Wash.*

CARR, RAY, president, Ray Carr Organization, *Portland, Ore.*

COLE, A. R., garage foreman, Pacific Telephone & Telegraph Co., *San Francisco*.

CONTINENTAL OIL CO., *Ponca City, Okla.*

CUNNINGHAM, GEORGE ALLIN, sales engineer, Imperial Oil, Ltd., *Toronto, Ont., Canada*.

CUTHILL, ROBERT W., assistant chief draftsman, Naval Aircraft Factory, *Philadelphia*.

ETZLER, GENE F., district service manager, The White Co., *Los Angeles*.

FAIRALL, EARL L., design draftsman, aeronautic, Naval Aircraft Factory, *Philadelphia*.

FETTY, HOMER DEWITT, manager, Sunset Automotive Service, *Los Angeles*.

FINK, JAMES O., chief designer, research division, Continental Motors Corp., *Detroit*.

GLICK, R. M., general manager, secretary and treasurer, Harmony Short Line Motor Transportation Co., *Pittsburgh*.

HANNA, MAURICE, automotive electrician, Storage Battery Supply Co., *Seattle*.

HASKINS, GEORGE WILLIAM, associate professor of aeronautical engineering, Purdue University, *Lafayette, Ind.*

HAYS, RAYMOND E., design draftsman, Naval Aircraft Factory, *Philadelphia*.

HERLING, HARVEY C., student, engineering department, Cadillac Motor Car Co., *Detroit*.

HIBBARD, THOMAS L., designer, art and color section, Fisher Body Corp., *Detroit*.

HODSON, CHARLES FRANCIS, senior technical assistant, Fairey Aviation Co., Ltd., *Hayes, Middlesex, England*.

HOLSTEN, FRANK E., vice-president, Barnsdall Refineries, Inc., *Tulsa, Okla.*

INATOMI, HISAO, ordnance lieutenant, commander, Imperial Japanese Navy; member, engine design Kaigun Kokusho, *Hatstudokibu, Taura, Japan*.

KAUFMAN, HARRY, aeronautical draftsman, Naval Aircraft Factory, *Philadelphia*.

KIEFER, HENRY E., superintendent of production, Kenworth Motor Truck Corp., *Seattle*.

KNOBLOCH, PHILIP, district service manager, The White Co., *Newark, N. J.*

KOETZLA, DAVID J., assistant engineer, Gilmore Oil Co., Ltd., *Los Angeles*.

KONHEIM, HARVEY S., chief engineer, Viscosity Engineering Corp., *New York City*.

KOSHINO, CHOJIRO, ordnance lieutenant, Imperial Japanese Navy; member, aircraft construction Kaigun Kokusho, *Hikokibu, Taura, Japan*.

LEAHY, JOHN T., district service manager, The White Co., *Kansas City, Mo.*

LEWIS, JOHN E., sales representative, Mack International Motor Truck Corp., *Chicago*.

LINN, WILLIAM J., owner, Linn Carburetor Co., 6334 Addis Street, *Pittsburgh*.

LINSE, HARRY J., president, Prismatic Spark Plug Co. of America, *Brooklyn, N. Y.*

The applications for membership received between July 15 and Aug. 15, 1932, are listed below. The members of the Society are urged to send any pertinent information with regard to those listed which the Council should have for consideration prior to their election. It is requested that such communications from members be sent promptly.

LITCHFIELD, ALLYNE C., material control manager, United States Rubber Co., *Detroit*.

MANSSON, MARTIN S., designer, Eclipse Aviation Corp., *East Orange, N. J.*

MARTIN, EDWARD A., assistant automotive

engineer, Vacuum Oil Co., Inc., *Paulsboro, N. J.*

McGEE, CARL G., research assistant, Vacuum Oil Co., Inc., *Paulsboro, N. J.*

MEAD, H. E., sales engineer, Bowen Products Co., *Detroit*.

MILLER, E. A., supervisor, garage foreman, Pacific Telephone & Telegraph Co., *San Francisco*.

MORRIS, HERMAN C., test engineer, Bureau of Standards, *City of Washington*.

MORRISON, JOHN D., manager, motor products, United States Rubber Co., *Detroit*.

O'NEIL, WILLIAM J., vice-president in charge of manufacturing, Dodge Bros., *Detroit*.

PARKIN, JOSEPH W., JR., 2251 North Broad Street, *Philadelphia*.

PALMER, JOHN J., assistant to president, DeSoto Motor Corp., *Detroit*.

RICHARDS, NICHOLAS, design draftsman, Naval Aircraft Factory, *Philadelphia*.

ROGERS, PAUL K., president, Skinner Chuck Co., *New Britain, Conn.*

SCHACHNER, MAX H., field engineer, Continental Motors Corp., *Muskegon, Mich.*

SHEA, GEORGE H., assistant automotive engineer, Vacuum Oil Co., Inc., *Paulsboro, N. J.*

SMITH, J. O'HARA, technical sales, Standard Oil Co. of California, *Los Angeles*.

SWENNES, BENJAMIN ARTHUR, experimental engineer, Borg-Warner Corp., *Rockford, Ill.*

SZABADOS, CAROL, chief engineer, Leonida & Co. S. A., *Bucuresti Sos, Roumania*.

TAWS, FRANCIS ELTON, supervisor of motor equipment, H. J. Heinz Co., *Pittsburgh*.

THERRIEN, Z. W., department manager, Isaacson Iron Works, *Seattle*.

TOMLINSON, HERBERT R., JR., detail draftsman, Naval Aircraft Factory, *Philadelphia*.

TURNER, HAROLD HORTON, research Diesel engineer, International Harvester Co., *Chicago*.

VERGAN, W. F., air-brake supervisor, Missouri, Kansas & Texas Railroad, *Parsons, Kan.*

VERRIER, F. J., salesman and service engineer, Johns-Manville Corp., *Baltimore*.

VON MEISTER, F. W., American agent, Maybach Motor Co., *New York City*.

WOODWARD, ROBERT D., experimental test, Hudson Motor Car Co., *Detroit*.

Notes and Reviews

AIRCRAFT

Wheel Brakes and Undercarriages. By S. Scott-Hall. Published in *The Journal of the Royal Aeronautical Society*, May, 1932, p. 386. [A-1]

Problems connected with wheel brakes, according to the author, are very specialized and have a particular interest at the present time. For this reason he deals with wheel brakes in the first portion of the paper and follows with a discussion of the more general aspects of undercarriage development.

The problems facing the designer who desires to equip an existing aircraft with wheel brakes are listed as: (a) what alterations are necessary to the undercarriage? (b) what method of operation is to be employed by the pilot? (c) how is the pilot's effort to be transmitted or relayed to the brakes? and (d) what type of brake is to be used? These problems are considered at length by the author.

Under the heading, General Aspects of Undercarriage Development, the author deals with landing and taxiing loads of aircraft, various makes of shock-absorbing or oleo legs, taxiing qualities and drag of undercarriages, the divided undercarriage, retractable undercarriages, wheel fairings, the internally sprung wheel, the low-pressure wheel, tail wheels and the energy absorption of an airwheel.

Wind-Tunnel Research Comparing Lateral-Control Devices, Particularly at High Angles of Attack. III—Ordinary Ailerons Rigged Up 10 Deg. When Neutral. By Fred E. Weick and Carl J. Wenzinger. N.A.C.A. Report No. 423; 1932; 12 pp., with tables and charts. [A-1]

Effect of Length of Handley Page Tip Slots on the Lateral-Stability Factor, Damping in Roll. By Fred E. Weick and Carl J. Wenzinger. N.A.C.A. Technical Note No. 423, July, 1932; 6 pp., 11 figs. [A-1]

Calculation of Potential Flow Past Airship Bodies in Yaw. By I. Lotz. Translated from *Ingenieur-Archiv*, Vol. II, 1931. N.A.C.A. Technical Memorandum No. 675, July, 1932; 27 pp., 23 figs. [A-1]

Towing Tests of Models as an Aid in the Design of Seaplanes. By P. Schröder. Translated from *Werft-Reederei-Hafen*, Vol. II, No. 16, Aug. 22, 1930. N.A.C.A. Technical Memorandum No. 676, July, 1932; 18 pp., 12 figs. [A-1]

ENGINES

Engine-Mounting Stresses. By R. Rodger. Published in *The Aircraft Engineer*, supplement to *Flight*, April 29, 1932, p. 376e (29). [E-1]

The object of the author of this paper is to collate and present in practical form the available information on the subject of aircraft engine-mounting stresses. The article is continued in the supplement to *Flight*, May 27, 1932.

These items, which are prepared by the Research Department, give brief descriptions of technical books and articles on automotive subjects. As a rule, no attempt is made to give an exhaustive review, the purpose being to indicate what of special interest to the automotive industry has been published.

The letters and numbers in brackets following the titles classify the articles into the following divisions and subdivisions: Divisions—A, Aircraft; B, Body; C, Chassis Parts; D, Education; E, Engines; F, Highways; G, Material; H, Miscellaneous; I, Motorboat; J, Motorcoach; K, Motor-Truck; L, Passenger Car; M, Tractor. Subdivisions—1, Design and Research; 2, Maintenance and Service; 3, Miscellaneous; 4, Operation; 5, Production; 6, Sales.

The Cowling of Air-Cooled Engines. By W. G. A. Perring. Published in *Aircraft Engineering*, May, 1932, p. 123. [E-1]

This article is a summary report of wind-tunnel tests of the effect on performance of the various types of cowling covered in detail in Reports and Memoranda No. 1413 of the British Air Ministry.

Helmet cowls, Townsend rings, the effect of cowling on cooling, the scale effect and the effect on climb are the subjects covered.

The Effect of Humidity on Engine Power at Altitude. By D. B. Brooks and E. A. Garlock. N.A.C.A. Report No. 426, 1932; 9 pp., with tables and charts. [E-1]

Preliminary Photomicrographic Studies of Fuel Sprays. By Dana W. Lee and Robert C. Spencer. N.A.C.A. Technical Note No. 424, July, 1932; 7 pp., 7 figs. [E-1]

The Combustion of an Oil Jet in an Engine Cylinder. By L. R. Underwood. Published in *The Proceedings of the Institution of Mechanical Engineers*, Vol. 121, December, 1931, p. 379. [E-1]

The author contends that, while the problems of the formation, motion and ignition of oil drops in airless-injection engines have been the subject of much theoretical and experimental research, less work seems to have been done on the processes of combustion of oil jets in actual engines than on other phases, and predictions based on closed-vessel experiments have not so far shown satisfactory agreement with observations on engines. Thus, formulating any complete theory that is applicable to both closed-vessel and engine experiments has been impossible.

To study the combustion of the oil in an engine cylinder, the author fitted a quartz window to the hot-bulb of an airless-injection engine and constructed

a stroboscopic apparatus that enabled the flame to be photographed and studied in detail. From these observations and certain results of closed-vessel experiments he has formulated a theory that accounts for most of the observed phenomena in the engine and correlates them with the closed-vessel investigations.

The equipment is described in detail, the results are recorded and the theory fully explained.

Pump Characteristics Affect Diesel-Engine Torque. By P. M. Heldt. Published in *Automotive Industries*, May 28, 1932, p. 780. [E-1]

This is the fourth article in a series on Diesel-engine development. The third in the series, by Mr. Andrew Hornung, was reviewed in this department of the August issue of the S.A.E. JOURNAL.

Mr. Heldt considers the claim that the automotive Diesel engine, particularly the truck engine, has torque characteristics which enable it to "pull through" where a gasoline engine would be stalled, and he analyzes this factor with reference to the effect of pump characteristics.

Emission Spectra of Engine Flames. By Gerald M. Rassweiler and Lloyd Withrow. Published in *Industrial and Engineering Chemistry*, May, 1932, p. 528. [E-1]

The separate spectrographic studies of flame fronts and afterglows in a gasoline engine have been extended into the ultra-violet. The authors show that OH molecules are present in both flame fronts and afterglows. Further comparisons are made between the spectra of engine and burner flames. By using an improved technic, the spectra of knocking and non-knocking combustion were obtained simultaneously on one spectrogram, and thereby a number of uncertainties involved in the previous comparisons of spectra of these two types of combustion have been eliminated. A discussion of the relationship of this work to combustion studies of other workers is included.

The Induction System. By Oswald Hayes. Published in *The Automobile Engineer*, May, 1932, p. 222. [E-1]

The author stresses the importance of the induction system as the link between carburetor and combustion chamber and states that the respective areas of manifold riser, distribution tract and port feed-pipes should be determined in conjunction, not only with one another, but also with the areas of valve port, throat and the other variables between port face and combustion side of the valve seat. He considers in detail the basic factors and problems connected with the design of the induction system, which he contends is not really part of the work of the engine designer but a matter for the specialist.

The article is continued in the June and July issues of *The Automobile Engineer*.

(Concluded on next left-hand page)

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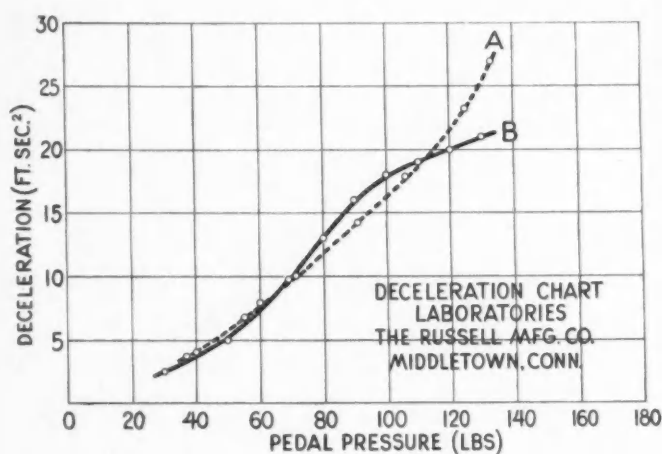
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Notes and Reviews Continued

Der Luftfahrzeugmotorenbau der Gegenwart und seine Beziehungen zum Kraftfahrzeugmotorenbau. By Oskar Kurtz. Published in *Automobiltechnische Zeitschrift*, May 25, p. 242, and June 10, 1932, p. 276. [E-1]

Are the forms of aircraft and automobile engines necessarily so divergent as to afford no common ground for development? In discussing the topic, the author of this technical note of the German institute for aeronautical research sets forth the fundamentals of design and operating requirements of the two types of powerplant, reviews the present state of aircraft-engine development, compares it with that of automobile engines of today and suggests a program for future growth. This program emphasizes the necessity for cooperative efforts in fields of mutual interest, such as air-cooling for in-line engines, Diesels and the problems involved in increased engine speed.

A Bibliography of the Vibration of Shafts, Vibration Measurements and the Design of Crankshafts. Compiled by A. C. Bates and M. J. Zucrow. Research Bulletin No. 39. Published by the Engineering Experiment Station, Purdue University, Lafayette, Ind., November, 1931; 107 pp. [E-3]

Since a knowledge of the vibration characteristics of an internal-combustion-engine crankshaft and the accompanying vibration stresses is recognized as being of fundamental importance in the design of the shaft, the bibliography presented in this bulletin has been developed from that point of view, making references concerning shaft vibration the foundation of the work.

The bibliography is very complete and is grouped under the following classifications: (a) Transverse Vibration of Shafts and Rods; (b) Torsional Vibration; (c) Vibration-Measuring Instruments; (d) Elastic Hysteresis; (e) Crankshaft Design; (f) Balancing, Engine Dynamics and Vibration; (g) Crankshaft Failure; and (h) Design of Shafts.

A list of papers and books on the general theory of vibration and on the theory of torsion of shafts is also included.

The Film Lubrication of the Journal Bearing. By R. O. Boswall. Published in abridged form in *Engineering*, April 29, 1932, p. 527. [E-4]

The author points out that, although during recent years film lubrication has been applied successfully to the thrust bearing, its application to the ordinary journal bearing has proved less satisfactory. The difficulties are attributed to irregularities in operation caused by imperfect mechanical finish of the bearing surfaces, distortion resulting from the action of load and temperature changes, and journal deflection; and secondly, to constructional differences.

Reference is made to certain special bearings designed to overcome some of these difficulties, but the main object of the investigation herein reported was to determine the conditions governing the effective operation of a film-lubricated journal bearing fitted with an ordinary fixed brass and to obtain information concerning (a) the influence of length of arc subtended by the brass upon the formation and maintenance of the film, (b) the effect of loading the brass eccentrically, (c) the effect of alterations in load and speed upon the position taken up by the journal relative to the brass and (d) the magnitude of the film thickness and frictional resistance for various working conditions.

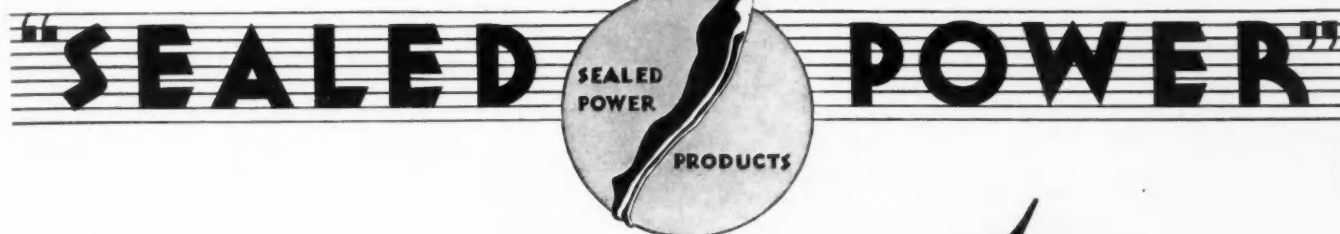
The paper is continued in the issue of *Engineering* for May 20 and June 3, and 10.

Oil Engines in Passenger Transport. By H. F. Haworth and P. E. Biggar. Presented at the 22nd Annual Congress of the Tramways, Light Railways and Transport Association, London, May 1932. [E-4]

Having traced the evolution of a special high-speed type of oil engine for use in road vehicles, the authors examine the special claims of this engine in the field of passenger transport. Pointing out that the present relative cost of oil fuel is temporary and uneconomic, they present data to show the importance of the second main advantage of the engine, that is, its high thermal efficiency. The various disadvantages of the engine are then examined and evaluated, as far as possible, and figures are presented to show the true economic position of the engine when all factors are taken into account. The authors conclude that, although falling short of the extravagant claims made in its favor, the oil engine still presents a substantial advantage in running cost over its gasoline rival.

(Continued on next left-hand page)

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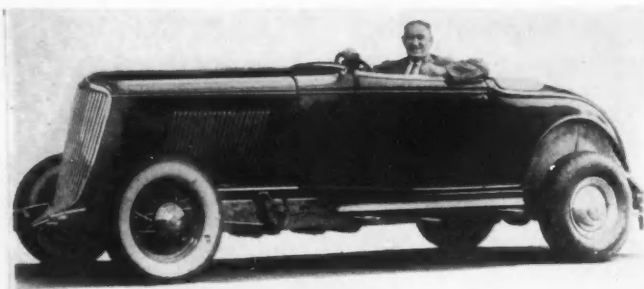
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Notes and Reviews

Continued

HIGHWAYS

Highway Traffic Capacity. By A. N. Johnson. Published in *Public Roads*, May, 1932, p. 41. [F-1]

This paper is a report of a study of the relative traffic capacity of two, three and four-lane highways. The project was undertaken as a cooperative arrangement between the United States Bureau of Public Roads, the State Roads Commission of Maryland and the University of Maryland, under the immediate supervision of the author, who is dean of the College of Engineering of the University.

The basic data for this discussion are the result of traffic counts taken during the summers of 1930 and 1931.

Report of a Survey of Traffic on the Federal-Aid Highway Systems of 11 Western States, 1930. By the Bureau of Public Roads of the United States Department of Agriculture and the highway departments of the States included. Published by the Government Printing Office, City of Washington, 1932; 85 pp., illustrated. [F-4]

This report is a summary of the facts concerning traffic upon the Federal-aid highways of Arizona, California, Colorado, Idaho, Nebraska, New Mexico, Nevada, Oregon, Utah, Washington and Wyoming, obtained in the period from September, 1929, to October, 1930.

The investigation was undertaken to obtain essential facts about the present density, type, capacities and distribution of traffic units as a basis for planning highway development to serve present and future traffic.

A classification of highways is presented, based upon the data collected, upon present population and population trends, upon predicted future traffic and upon an economic and physical analysis of other factors affecting the planning of a program of highway improvement.

MATERIAL

Some Aspects of the Corrosion Problem. By Ulick Richardson Evans. Published in *Engineering*, May 6, 1932, p. 559. [G-1]

This paper constitutes the 38th James Forrest lecture presented before the Institution of Civil Engineers in Great Britain. The first portion deals with the principles of corrosion and its prevention, and the second part with the protection of structural steel work from corrosion. Throughout the article the author emphasizes the importance of the chemical principles and urges that it is far better for the engineer to acquire sufficient chemical knowledge to guide his own choice of materials than to rely entirely upon the advice of outside persons, whose knowledge of the engineering aspect of the matter is often imperfect.

The lecture is concluded in the May 6 issue of *Engineering*.

Some Experiments on the Nitrogen-Hardening of Cast Iron. By J. E. Hurst. Published in abridged form in *Engineering*, May 6, 1932, p. 555. [G-1]

This paper, read before the Iron and Steel Institute of Great Britain, describes the experimental results that form part of an investigation of the degree of hardness obtainable and the general strength properties of aluminum-chromium cast-iron suitable for nitrogen hardening. The composition of the alloy cast iron is within the requirements of the commercial product known as Nitricastiron.

The author discusses centrifugally cast material, sand-cast material, chemical analyses, machining, microstructure and nitrogen-hardened surface.

The Theory and Practice of Nitrogen Case-Hardening. By A. Fry. Published in abridged form in *Engineering*, May 13, 1932, p. 587. [G-1]

This paper, presented before the Iron and Steel Institute of Great Britain, consists of reports of experiments made with a view to gaining a closer insight into the nature of the hardening effect of nitrogen and the bearing upon the formation and decomposition of the nitrides of such elements as influence the behavior of nitriding steel under the treatment, particularly iron, chromium, manganese, tungsten, vanadium, titanium and aluminum.

The experiments serve to explain the mechanism of the nitrogen case-hardening process when applied to the commercial nitriding steels.

(Continued on next left-hand page)

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ALLOY STEELS

Notes and Reviews

Continued

Magnesium-Alloys Protection by Selenium and Other Coating Processes. By G. D. Bengough and L. Whitby. Paper presented before the Institute of Metals, London, March 9 and 10, 1932. [G-1]

A process developed for the production of films of selenium on several light magnesium alloys is described. These films offer considerable resistance to the corrosive action of sea-water spray, the authors contend.

The films are normally produced by immersion for a few minutes in a bath containing selenious acid at laboratory temperature but may also be produced by rubbing the alloy with porous material dipped in the bath.

The film has to a limited extent the property of self-healing, especially when immersed in stagnant sea-water. The film is further described as only a few thousandths of a millimeter thick, producing no appreciable dimensional change in the alloys treated. It is said to form a satisfactory base for certain kinds of paint, and further work on this phase is now in progress.

The "Fogging" of Nickel. By W. H. J. Vernon. Paper presented before the Institute of Metals, London, March 9 and 10, 1932. [G-1]

A study has been made of the characteristic filming or "fogging" that occurs under certain conditions on polished nickel surfaces. The effect is attributed mainly to the catalytic oxidation of small quantities of atmospheric sulphur dioxide; suspended sulphates also play a minor part. Humidity and light were found to affect this process. Methods for suppressing or inhibiting the formation of the primary film are suggested.

Note on the Interaction of Aluminum and Water Vapor. By Richard Seligman and Percy Williams. Paper presented before the Institute of Metals, London, March 9 and 10, 1932. [G-1]

The statement having been made recently that aluminum and its alloys are rapidly attacked by superheated steam at 300 to 350 deg. cent. (572 and 662 deg. fahr.), the authors undertook experiments and found that no such attack occurs under the conditions they define.

The paper is published in abridged form in *Engineering*, March 18, 1932, p. 353.

The Thermal Conductivity of Some Non-Ferrous Alloys. By D. Hanson and C. E. Rodgers. Paper presented before the Institute of Metals, London, March 9 and 10, 1932. [G-1]

In this paper the authors describe the results of thermal-conductivity tests on a series of aluminum-copper alloys, and also the effects of aluminum, nickel, iron, phosphorous and arsenic on the thermal conductivity of copper. The paper is published in abridged form in the March 18, 1932, issue of *Engineering*, p. 354.

The Age-Hardening of Some Aluminum Alloys of High Purity. By Marie L. V. Gaylor and G. D. Preston. Paper presented before the Institute of Metals, London, March 9 and 10, 1932. [G-1]

An investigation into the age-hardening of a series of alloys made with high-purity aluminum containing 4 per cent of copper, to which iron, silicon and magnesium were added either independently or together, confirmed the results of previous investigators.

This paper forms part of a research conducted for the alloys subcommittee of the Aeronautical Research Committee with the support of the Metallurgy Research Board of the Department of Scientific and Industrial Research, England.

Intercrystalline Corrosion of Duralumin. By A. J. Sidery and K. G. Lewis. Paper presented before the Institute of Metals, London, March 9 and 10, 1932. [G-1]

Experiments were made to determine the influence of overstrain in tension or in compression and of certain modifications of heat-treatment on the tendency of duralumin to develop intercrystalline corrosion. To evolve a reliable test that would enable an estimate to be made of the relative susceptibility of various samples of duralumin to this form of corrosion in a reasonable time, several reagents were investigated.

(Continued on next left-hand page)

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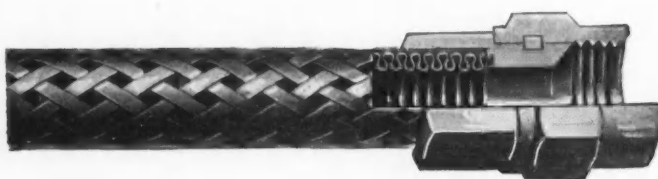
K-18

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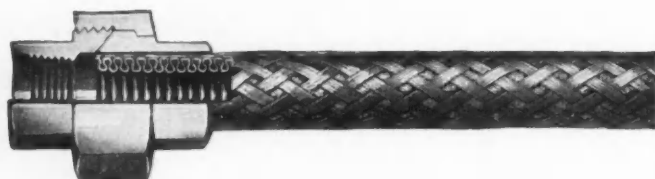
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Notes and Reviews

Continued

The Relative Corrodibilities of Ferrous and Non-Ferrous Metals and Alloys. Part III—Final Report. The Results of Three Years' Exposure at Southampton Docks. By J. Newton Friend. Paper presented before the Institute of Metals, London, March 9 and 10, 1932. [G-1]

Nearly 100 bars of ferrous and non-ferrous metals were exposed to sea action at Southampton Docks for three years, and an account is given of 72 of these. The metals examined included lead, zinc, tin, aluminium, copper, nickel and various alloys containing iron, chromium, nickel, copper and zinc. The effect of grain size on the corrodibility of brass was also studied and the results seem to indicate that small grain is preferable to coarse.

Other papers of interest presented before the Institute of Metals are as follows:

Report on the Influence of Temperature on the Elastic Behavior of Various Wrought Light-Metal Alloys. By Franz Bollenrath. [G-1]

Some Bronze Specimens from the Royal Graves at Ur. By C. F. Elam. [G-1]

The Behavior of Single Crystals of Bismuth Subjected to Alternating Torsional Stresses. By H. J. Gough and H. L. Cox [G-1]

Observations on the Pressure of Fluidity of Annealed Metals. By Hugh O'Neill and Hubert Greenwood. [G-1]

The Solubility of Aluminum in Magnesium in the Solid State at Different Temperatures. By P. Saldau and M. Zamotorin. [G-1]

The Properties of Copper in Relation to Low Stresses: The Effect of Cold-Work, Heat-Treatment and Composition. Part I—Tensile and Compression Tests under Short-Time Loading, by O. F. Hudson and J. McKeown. Part II—Creep Tests at 300 and 350 Deg. Cent. (572 and 662 Deg. Fahr.) of Arsenical Copper and Silver-Arsenical Copper, by H. J. Tapsell and A. E. Johnson. Published in abridged form in *Engineering*, issues of March 11, 1932, p. 310, and April 15, 1932, p. 474, respectively. [G-1]

The Engineering Silver Solders. By Ernest A. Smith. Published in *Engineering*, April 15, 1932, p. 449. [G-1]

The increasing use being made of silver solders in the engineering industries has brought into prominence the importance of the alloys of the ternary system, silver-copper-zinc, which forms the basis of virtually all the silver solders used in brazing operations. This increased interest in the system undoubtedly results from the prominence the alloys are now taking in all brazing operations of both ferrous and non-ferrous materials. These materials cover a wide range and in consequence the composition of the silver solders varies considerably according to the class of metal or alloy on which they are to be used.

The author reviews briefly the results of recent research toward establishing the constitution and structure of the silver-copper-zinc system, together with data on the mechanical properties. The need for further investigation is emphasized.

The Manufacture of Staybrite Steel Sheets and Strip. Published in *Engineering*, April 25, 1932, p. 503. [G-5]

This article describes in detail the methods of production employed by Thomas Firth & John Brown, Ltd., discoverers of the corrosion-resisting properties of high-chromium steel and producers of a group of special steels containing, in addition to a high percentage of chromium, a high percentage of nickel and small proportions of other alloying elements. These alloying elements give greatly improved corrosion-resisting properties in conjunction with a high degree of softness and ductility.

These Staybrite steels, as they are named, differ materially from stainless steel in that, with such combinations of nickel and chromium, they cannot be hardened by heat-treating; in fact, the effect of heating and quenching is to increase the softness and ductility.

Although these steels have many forms and applications, the article is concerned only with their use as steel sheets and strips. The concluding portion of the paper appears in *Engineering*, May 6, 1932, p. 533.

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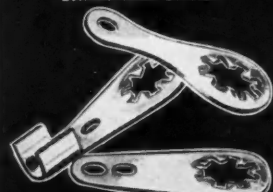
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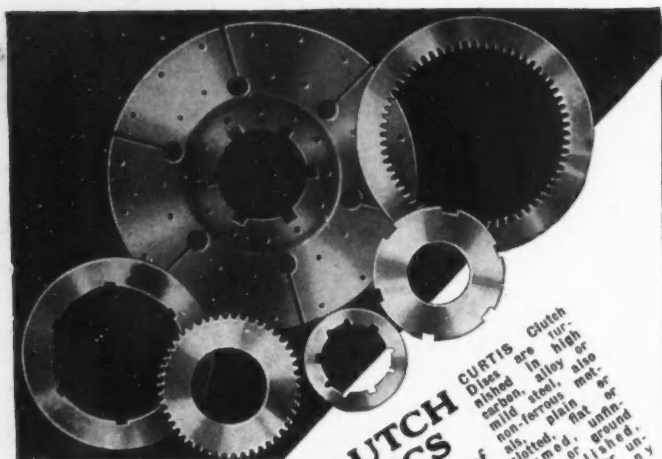
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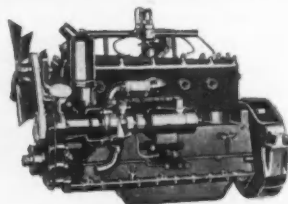
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Notes and Reviews

Continued

Gum Formation and Its Inhibition in Motor Spirits. By W. H. Thomas. Published in *The Journal of the Institution of Petroleum Technologists*, May, 1932, p. 350. [G-1]

The author reviews briefly the research work done on the subject of gum inhibitors for use in motor fuels. The theories of gum formation are outlined, with an explanation of the action of inhibitors of gum formation. Short abstracts from British patent literature dealing with inhibitors of color and gum formation are included, as is also a bibliography of both British and American published literature on the subject.

Gum Stability of Gasolines. By J. W. Ramsay. Published in *Industrial and Engineering Chemistry*, May, 1932, p. 539. [G-1]

This article covers the results of a study made of the variables in the oxygen bomb test for induction periods of gasolines. The direct relationship between the induction period and the period of gum stability is confirmed. A quantitative relationship between the induction period and the oxygen pressure was developed; this relationship being independent of temperature. A relationship between the induction period and the temperature also was developed. A new method is proposed for extrapolating the results of bomb tests to estimate the stability of gasoline at temperature and pressure conditions encountered in practical storage.

Gasoline and the Gasoline Engine. By O. Thornycroft and A. Ferguson. Published in *The Journal of the Institution of Petroleum Technologists*, May, 1932, p. 329. [G-3]

This article is a general review of the present status of gasoline production, consumption and quality and a survey of the trends in gasoline-engine design with respect to fuel characteristics.

MISCELLANEOUS

La Crise des Reseaux de Chemins de Fer Français: La Concurrence du Rail et de la Route. Published in *Le Génie Civil*, June 18, 1932, p. 617. [H-1]

The financial crisis confronting the railroads of France, the part played by highway transportation in contributing to their unfortunate situation, other causes and suggested remedies have been discussed before three meetings of the French society of engineers of art and industry. The points covered at each of these meetings are summarized in this review. To harmonize the interests of the various parties involved, a committee for the co-ordination of transport by rail and highway has been formed, on which the railroads, motor-transport companies and users of the facilities are represented.

Motorcycle Progress: Past, Present and Future. By H. D. Teage. Published in *The Automobile Engineer*, May, 1932, p. 238. [H-3]

The author sketches briefly the history of motorcycle development and discusses the present-day motorcycle, with particular reference to weather protection, silence, easy starting and flexibility. Mr. Teage is said to be in constant touch with both the motorcycle trade and the public, and from that point of view indicates the lines on which he hopes to see motorcycles develop.

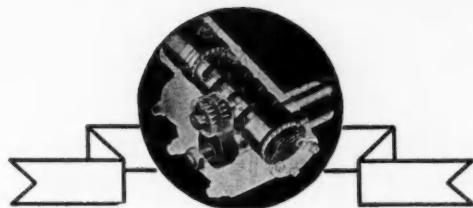
A Nation-Wide Survey of Taxicab Regulation. A. E. R. A. Bulletin No. 389. Published by the American Electric Railway Association, New York City, April 1, 1932; 293 pp. [H-4]

This bulletin presents the results of a comprehensive survey of taxicab regulation in the United States and certain Canadian cities, with special reference to State laws and local ordinances adopted for the stabilization of the industry through the elimination of unfair competition from cut-rate taxicabs.

Essential points of taxicab regulations are analyzed, accompanied by tabular data showing the extent of adoption and the particular form in which each appears in various municipal ordinances and State laws. The history and status of taxicab regulation in 14 States, the District of Columbia and New York City are reviewed, together with a summary of the actions taken by State public utilities commissions pursuant to the laws.

Appendixes include copies of State taxicab regulatory laws, typical city traffic ordinances and comparative tables indicating the extent to which these laws and ordinances have been adopted.

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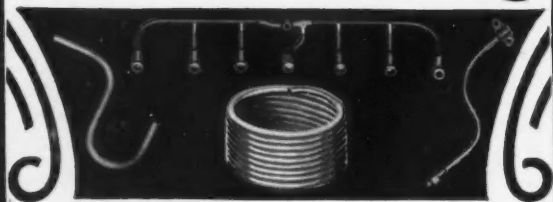
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Notes and Reviews

Concluded

MOTOR-TRUCK

The Need for Coordinated Transportation. By J. F. Winchester. Published in *Automotive Daily News*, May 20, 21 and 24, 1932. [K-4]

Mr. Winchester deals with the moot question of the railroad versus the motor-truck for freight haulage and quotes at length from a statement by J. R. Turney, vice-president of the St. Louis Southwestern Railway Lines. Mr. Turney frankly terms the motor-truck the railroad's "more efficient competitor" but decries the policy of attempting to legislate it out of existence and urges coordinated transportation as the solution to the problem. Mr. Winchester stresses the need for an active interest on the part of automotive engineers in this field.

The paper was presented before the New England Section of the Society.

ADAC-Avusrennen; ein Technischer Rückblick. Published in *Automobil-technische Zeitschrift*, June 10, 1932, p. 267. [L-1]

In reviewing the chassis design of the entries in the recent German automobile races, the author deplores that the races contribute so little to passenger-car development. Only two details are said to be of interest for wider development; these are the lower center of gravity and the wider tread. Other topics covered in this technical summary of racing-car design are the reduction of air resistance, engines, brakes and the relation between car weight and engine capacity.

Acoustical Treatment of Automotive Problems. By William Jack. Published in *Automotive Daily News*, May 12, 13, 14, 17 and 18, 1932. [L-3]

This paper deals with the fundamentals of sound and the methods of measuring sound, together with their application to the automobile. With this introduction, the author proceeds to a consideration of car noises and their elimination. Mr. Jack presented his paper before the Pittsburgh Section of the Society.

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